

individual reflective journal

My experience of working within our team

During our initial group meetings we decided to design a street robot that could provide light and clean up rubbish. The idea This idea arose out from nights in Swansea when the street lights were out and the streets were very dark and intimidating. So we wanted a robot that would not only clean the streets, but also serve to illuminate dark areas and promote a sense of safety.

We were quickly assigned responsibilities, and I was the Mechanical Engineer for the entire project, responsible for designing the robot's mobility system, sensors, and mechanics. After discussing the main functions of PROMETHEUS, such as the mobility system, the light system, and most importantly the safety system, I decided to find a similar small tracked robot to assist me in my presentation.

After the first Progress Presentation, I successfully assembled the robot and tested a few of its modes, then I tried to add a buzzer module to the original functionality to make the robot sound an alarm in case of a collision. But I accidentally overwrote the original code and didn't backup it in advance. Fortunately, I contacted customer service and got the zip of the original code. However, when I tried to rewrite the code, I found that the programming software indicated that 'the code is too large and exceeds the memory limit of the chip'. Therefore, in the second Progress Presentation, I was only able to show the robot's appearance and give a verbal presentation of its functions, but not a full presentation.

In the group discussion afterwards, I told Ava, our member in charge of Robot Intelligence development, about the situation and gave him the robot and the code zip. After analysing it and removing some parts that were not particularly critical to our project, he rewrote and burned the code. Although the modified robot was not as responsive as it was initially, the good news was that it could move around and demonstrate its functionality properly. Assisting me in completing the Mechanical part and the introduction of the various sensors.

At the same time, Thomas and I rented the school's mindstrom ev3 Lego, and I tried to explain how the rubbish collection system of PROMETHEUS works through Lego, but unfortunately the version of the part provided by the school was too old, and none of the applications that I found could recognise it, so I couldn't code it. And at the end of the presentation, the car we assembled fell apart due to poor fixing, but I was able to finish the general explanation.

Team member performance

Thomas Qian (5/5): He made an excellent contribution to the design, structural

conception and conclusion of the project, has a strong sense of responsibility and is good at organising meetings. He is very good at animation and look and feel, and is very good at getting the mood going during presentations.

Ava Kennedy (5/5): He was extremely efficient in organisation, task allocation and Gantt chart scheduling, ensuring manageable progress and smooth communication. Very good at modifying code and helping me with code issues.

Matthew Delehay (5/5): Matthew was responsible for the safety module and budget, his careful analysis of component prices greatly helped me with budget planning when selecting mechanical parts.

Nour Al Mutwaly (5/5): Nour conducted market research and application scenario planning was clear and precise, providing a feasibility assessment for the actual launch of the robot. She is very attentive and friendly when communicating in the group.

Our design's limitations

Our robot is not the final version, and further testing is needed to see if the shells are compatible with the functions and the chips. For example, the cartoon appearance designed by Thomas may encounter incompatibility between the size, circuit layout and hardware interface when actually assembled.

In addition, Prometheus currently does not have the function of waste classification although it can clean up the rubbish. There are recyclable, non-recyclable and hazardous wastes in municipal rubbish, etc. To add a sorting system would not only require an additional recognition module, but also a more complex robotic arm structure, which is difficult with the current space and budget.

Furthermore, the infrared and ultrasonic sensors used in the robot are unstable in certain special environments (e.g., heavy rain, strong ground reflections), which affects the obstacle avoidance effect and navigation accuracy. Especially in complex urban terrains, this may pose an operational risk.